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New Highway Survey Method May Be a Lifesaver

High-tech import overcomes one of the biggest safety issues facing highway surveyors

One of the biggest stumbling blocks associated with highway surveys conducted for the purpose of resurfacing or re-construction revolves around safety.

Traditional methods of surveying a highway use conventional spirit leveling or EDM techniques. Both procedures require access to the road surface to enable a member of the survey crew to hold a level rod or prism target at the point to be measured.

The problem, however, is that to do this safely, long sections of one or more lanes of the highway must be closed. This is, to say the least, unappreciated by the traveling public.

It's also expensive. In Los Angeles, an estimate from Caltrans states that a typical weekday cost to the motoring public for closing one mile of freeway lane can exceed \$50,000. This takes into account, among other factors, the costs of delivery trucks, business trips, increased accidents, and police attendance.

A new technique pioneered in the United Kingdom and presently being implemented in projects throughout southern California promises to put an end to traffic delays and to the danger encountered by survey crews as they work alongside vehicles traveling at highway speeds.

Clear Cone is a new technology that allows surveyors to execute a topographic survey of an active highway by remote sensing without interrupting the normal traffic flow. It eliminates the need for surveyors to physically occupy the lanes. Instead, a surveyor drives a specially-designed vehicle along the hard shoulder of the highway and obtains positions along the pavement.

The observations are taken directly to the road surface without the need of special marking or targeting of observed points. Measurements are recorded through the use of a computer and an infrared beam. These measurements are taken through gaps in traffic, therefore there is no need to delay or divert traffic in any way.

Briefly, here's how it works:

A network of permanent ground monuments is observed during the survey. These monuments

may relate to previous surveys or be connected to a specific grid and level datum. They remain after the survey is complete to enable subsequent construction work to be staked from the same reference system. All detail topographic points are observed on this reference system and consist of X, Y, and Z coordinates together with labels describing the feature observed and its relationship to other points.

Highway surface points are observed as X-Sections or longitudinal strings either at visible features such as lane markings or on a pre-defined grid system. Other features such as fences, bridge soffits, light poles, drainage structures, pipe inlets, and the like can be surveyed by this remote method providing they are visible from the observing Clear Cone vehicle.

In addition to remotely measured points, all the usual topographic features along the side of the route can be observed at the same time.

The survey information is provided in the form of a digital model or computer plotted drawings. Very little data processing time is required because the three-dimensional pavement model is computed and validated as the field work progresses.

Psomas and Associates is the only engineering firm currently licensed to use the technology in the United States.

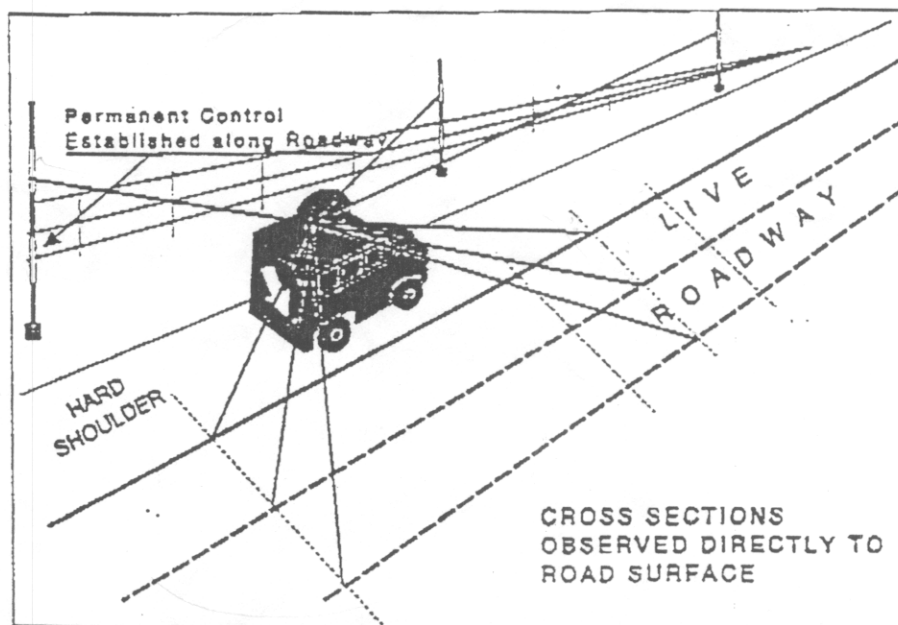
According to Fred Henstridge, PLS, Psomas' vice president of large scale surveying, the firm is currently managing to put the Clear Cone system to work on one project per week. The projects, all Caltrans awards, range from one to three miles in length.

The results of a demonstration project conducted by Psomas this summer found the accuracy of Clear Cone observations was indistinguishable from measurements made by EDM and spirit leveling techniques. The cost of a Clear Cone survey was found to be less than the cost of a traditional survey plus the costs of traffic lane management.

But, says Henstridge, the biggest issue isn't strictly the cost of the survey. "It's not only the cost savings on the survey side; it's the tremendous cost savings on the public side and the safety factor," he explains.

He predicts that Clear Cone surveys will one day replace traditional methods.

"It's like GPS," he says. "Five years ago GPS was an exotic thing; now if you don't have it you're out of business."



How the Clear Cone system works.

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